



Atty. Dkt. No.4714 P1/AMI-00-11

COMBINED DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that: This declaration is of the following type: original [] divisional [] continuation [X]continuation-in-part MING XI, ASHOK SINHA, MORIS KORI, ALFRED W. MAK, JEONG SOO BYUN, LAWRENCE CHUNG-LAI LEI, AND HUA CHUNG My residence, post office address and citizenship are as stated below next to my name. I believe I am an original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled: TITLE OF INVENTION METHOD AND APPARATUS FOR DEPOSITING REFRACTORY METAL LAYERS EMPLOYING SEQUENTIAL DEPOSITION TECHNIQUES TO FORM A NUCLEATION LAYER SPECIFICATION IDENTIFICATION The specification of which: is attached hereto [X] was filed on 10/03/2000, under Serial No. 09/678,266 and was amended on (if applicable) was described and claimed in PCT International Application No. and as amended under PCT Article 19 on ACKNOWLEDGMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose all information I know to be material to patentability in accordance with Title 37, Code of Federal Regulations, 1.56, and which is material to the examination of this application; namely, information where there is a substantial likelihood that a reasonable Examiner would consider it important in deciding whether to allow the application to issue as a patent, and In compliance with this duty there is attached an Information Disclosure Statement in accordance [] with 37 CFR 1.98.

I hereby claim foreign priority benefits under Title 35, United States Code, §119, of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America or of any United States Provisional Application(s) listed below, and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

	ming ou	te octore and	oi aic apprication(c) oron priority is on	··
	[X]	• • •	lications have been fations have been filed		
A.				tion(s) filed within 12 der 35 U.S.C. § 119	mos. (6 mos. for design) prior to this
	Country	y/PCT	Application No	<u>Date Filed</u>	Priority Claimed [] Yes [] No [] Yes [] No
В.	All fore applicate Country Applicate Filing date	tion : tion No:	tion(s), if any, file	d more than 12 mos	, (6 mos for design) prior to this U.S
			PRIORITY	/ CLAIM (35 U.S.C. §	120)
internati subject i provided that is m reasonal	ional app matter of d by the f naterial to ble Exam ccurred b	lication(s) deach of the correct paragraph the examination would continue to the country of the	esignating the Unite laims of this applica h of Title 35, United tion of this applicati consider it important	ed States of America that ion is not disclosed in the States Code, §112, I acon (namely, information in deciding whether to	f any United States application(s) or PCT nat is/are listed below and, insofar as the hat/those prior application(s) in the manne knowledge the duty to disclose information where there is substantial likelihood that a allow the application to issue as a patent national or PCT international filing date or
	[] [X]		olications have been ations have been file		
	Serial N	l <u>o</u> . <u>Fil</u>	ing Date	Some Patented Pending	Abandoned
(09/605,59	93 6/2	28/2000	Pending	

I hereby appoint the following attorneys and/or agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

Peter J. Sgarbossa

Donald Verplancken

Lawrence Edelman

Michael B. Einschlag

Joseph Bach

Registration No. 25,610

Registration No. 23,217

Registration No. 25,226

Registration No. 29,301

Registration No. 37,771

Raymond Kam-On Kwong Registration No. 37,165

James C. Wilson Registration No. 35,412
Robert W. Mulcahy Registration No. 25,436
Sarah Brashears Registration No. 37,087
Kenneth C. Brooks Registration No. 38,393

Send correspondence to: Direct telephone calls to:

Patent Counsel, MS/2061
Legal Affairs Dept.

1:

Applied Materials, Inc. P.O. Box 450A

Santa Clara, CA 95052

Kenneth C. Brooks

Law Office of Kenneth C. Brooks

512 527-0104

DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and, further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Sec. 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patents issued thereon.

Full name of first inve	ntor: Ming Xi				
Inventor's signature:				Date:	
Residence:	Milpitas, Calife	ornia			
Post Office Address:	138 Beaumere Milpitas, Calife	Way	5035		
	U.S.A.			Country of Citizenship	p: People's Republic of China
Full name of second ir	nventor: Ashok Sin	ha			
Inventor's signature: _	arlos	K	Sila	Date:	19101
Residence:	Palo Alto, Cali	fornia			7-1-1
Post Office Address:	4176 Hubbart 1	Drive			
	Palo Alto, Cali	fornia 9	95014		
	U.S.A.			Country of Citizenship	p: U.S.A.

Inventor's signature:		Date:
Residence:	Palo Alto, California	
Post Office Address:	55 Hamilton Drive	
	Palo Alto, California 94	301
	U.S.A.	Country of Citizenship: U.S.A.
Full name of fourth inve	entor: Alfred W. Mak	
Inventor's signature:		Date:
Residence:	Union City, California	
Post Office Address	32722 Fellows Court	
	Union City, California 9	4587
	U.S.A.	Country of Citizenship: U.S.A.
Full name of fifth inven	tor: Jeong Soo Byun	
Inventor's signature:		Date:
Residence:	Cupertino, California	·
Post Office Address	20975 Valley Green Dri	ve #257
	Cupertino, California 95	5014
	U.S.A. f_{j}	Country of Citizenship: South Korea
Full name of sixth inver	ntor: Lawrence Chung-Lai	Lei ,
Inventor's signature:	Jaurena Chy	dai de Date: 1/9/01
Residence:	Milpitas, California	Date1 1101
Post Office Address	1594 Country Club Driv	ve
	Milpitas, California 950	
	U.S.A.	Country of Citizenship: U.S.A.
Full name of seventh in	ventor: Hua Chung	
Inventor's signature:		Date:
Residence:	San Jose, California	Date.
Post Office Address	4645 Piper Drive	
	San Jose, California 951	29
	U.S.A.	Country of Citizenship: Republic of China
		,



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MING XI, ASHOK SINHA, MORIS KORI, ALFRED W. MAK, XINLIANG LU, KEN KAUNG LAI AND KARL A. LITTAU
My residence, post office address and citizenship are as stated below next to my name. I believe I am an original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled:
TITLE OF INVENTION
METHOD AND APPARATUS FOR DEPOSITING REFRACTORY METAL LAYERS EMPLOYING SEQUENTIAL DEPOSITION TECHNIQUES TO FORM A NUCLEATION LAYER
SPECIFICATION IDENTIFICATION
The specification of which:
 is attached hereto was filed on October 3, 2001, having Serial No. 09/678,266 and was amended on (if applicable) was described and claimed in PCT International Application No filed on and as amended under PCT Article 19 on
ACKNOWLEDGMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR
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havin	g a filing d	ate before	that of the applica	tion(s) of w	hich priority is cla	imed.
	[X] []		applications have lications have bee		ollows:	
A.			T/provisional ap any priority clain			mos. (6 mos. for design) prior to this
	Countr	ry/PCT	Application 1	<u>No</u>	Date Filed	Priority Claimed Yes [] No No
В.	All fore		cation(s), if any,	filed mor	e than 12 mos.	(6 mos for design) prior to this U.S.
	Country Applicat Filing da	tion No:				
			PRIOF	RITY CLA	IM (35 U.S.C. §12	0)
interna subject manne inform likelihe issue	ational app t matter of r provided ation that ood that a as a patent	lication(s) feach of by the fir is materia reasonable t) which of	designating the Uthe claims of this st paragraph of Ti to the examination Examiner would	Jnited State application the 35, United application of this a consider it	es of America that in is not disclosed ted States Code, § pplication (namely important in decident	any United States application(s) or PCT is/are listed below and, insofar as the in that/those prior application(s) in the 112, I acknowledge the duty to disclose y, information where there is substantial ding whether to allow the application to application(s) and the national or PCT
	[] [X]		pplications have b		llows:	
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	Serial No	<u>o</u> . <u>I</u>	iling Date	Pate	ented Pending	Abandoned
	09/605,59	3 6	5/28/2000	Pe	ending	

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Kenneth C. Brooks Registration No. 38,393

Send correspondence to: Dire

Direct telephone calls to:

Patent Counsel, MS/2061 Legal Affairs Dept. Applied Materials, Inc. P.O. Box 450A

Santa Clara, CA 95052

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Full name of first inven	tor: Ming Xi	
Inventor's signature: Residence:	Milpitas, California	Date: 1/9/2001
Post Office Address:	138 Beaumere Way Milpitas, California 95035	
	U.S.A.	Country of Citizenship: People's Republic of China
Full name of second in	ventor: Ashok Sinha	
Inventor's signature:		Date:
Residence:	Palo Alto, California	
Post Office Address:	4176 Hubbart Drive	
	Palo Alto, California 95014	
	U.S.A.	Country of Citizenship: U.S.A.

Full name of third inve	entor: Moris Kori		
Inventor's signature:			Date:
Residence:	Palo Alto, California		
Post Office Address:	55 Hamilton Drive		
	Palo Alto, California 943	01	
	U.S.A.	Country of Citizenship): U.S.A.
Full name of fourth inv	entor: Alfred W. Mak		
Inventor's signature:			Date:
Residence:	Union City, California	7-14	
Post Office Address	32722 Fellows Court		
•	Union City, California 94	587	
	U.S.A.	Country of Citizenship	: U.S.A.
Full name of fifth inven	tor: Xinliang Lu		
Inventor's signature:			Date:
Residence:	Sunnyvale, California		
Post Office Address	685 Garland Avenue #54		
	Sunnyvale, California 940	86	
	U.S.A.	Country of Citizenship:	People's Republic of China
Full name of sixth inver	ntor: Ken Kaung Lai		
Inventor's signature:			Date:
Residence:	Milpitas, California	•	
Post Office Address	1354 Terra Alta Drive		
	Milpitas, California 95035		
	U.S.A.	Country of Citizenship:	Republic of China (Taiwan)
Full name of seventh inv	ventor: Karl A. Littau		
Inventor's signature:			Date:
Residence:	Palo Alto, California		
Post Office Address	· · · · · · · · · · · · · · · · · · ·		
	Palo Alto, California 9430	3	
	U.S.A.	Country of Citizenship:	U.S.A.





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This declaration	is of the following type:	To the second se
[] [] [] [x]	original divisional continuation continuation-in-part	FEB 0 9 2001 A
MING XI,	ASHOK SINHA, MORIS KORI, ALFR CHUNG-LAI LEI, A	ED W. MAK, JEONG SOO BYUN, LAWRENCE AND HUA CHUNG
My residence, p first and joint in entitled:	ost office address and citizenship are as st nventor of the subject matter which is cla	ated below next to my name. I believe I am an original, imed and for which a patent is sought on the invention
	TITLE OF I	NVENTION
		REFRACTORY METAL LAYERS EMPLOYING ES TO FORM A NUCLEATION LAYER
	SPECIFICATION I	DENTIFICATION
The specification	n of which:	
[] [x]	was filed on 10/03/2000, under Serial N (if applicable) was described and claimed in PCT Inter	national Application No filed on
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A	ACKNOWLEDGMENT OF REVIEW O	F PAPERS AND DUTY OF CANDOR
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	[X]		lications have been tile		
Α.				ation(s) filed within 12 nder 35 U.S.C. § 119	mos. (6 mos. for design) prior to this
	Counti	ry/PCT	Application No	<u>Date Filed</u>	Priority Claimed [] Yes [] No [] Yes [] No
В.	All for			ed more than 12 mos.	(6 mos for design) prior to this U.S.
	Country Applica Filing d	ition No:	t_{j}		
			PRIORIT	Y CLAIM (35 U.S.C. §	120)
interna subject provide that is reasons which	tional app matter of ed by the material to able Exan	plication(s) defeach of the classification of the classification of the examination of th	signating the Unite aims of this applica of Title 35, United tion of this applicationsider it important	ed States of America thation is not disclosed in the States Code, §112, I action (namely, information to in deciding whether to	f any United States application(s) or PCT at is/are listed below and, insofar as the nat/those prior application(s) in the manner knowledge the duty to disclose information, where there is substantial likelihood that a allow the application to issue as a patent) national or PCT international filing date of
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	Serial N	No. <u>Fili</u>	ng Date	St Patented Pending	<u>Abandoned</u>
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			•		



I hereby appoint the following attorneys and/or agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

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Post Office Address	32722 Fellows Court		
	Union City, California 9	4587	
	U.S.A.	Country of Citizenship:	U.S.A.
Full name of fifth inven	tor: Jeong Soo Byun		
Inventor's signature:			Date:
Residence:	Cupertino, California	•	•
Post Office Address	20975 Valley Green Dri	ve #257	
	Cupertino, California 95	014	
	U.S.A.	Country of Citizenship:	South Korea
Full name of sixth inver	ntor: Lawrence Chung-Lai I	.ei	
Inventor's signature:			Date:
Residence:	Milpitas, California		
Post Office Address	1594 Country Club Driv	e	
	Milpitas, California 9503	35	
	U.S.A.	Country of Citizenship:	U.S.A.
Full name of seventh in	ventor: Hua Chung		
	11 00	1	10/-1
Inventor's signature:	// to Ch		Date: //8/0/
Residence:	San Jose, California		,
Post Office Address	4645 Piper Drive	V	
	San Jose, California 951		
	U.S.A.	Country of Citizenship:	Republic of China

wire sty

1-10-01

Atty. Dkt. No.4714 P1/AMI-00-11

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As a below nam	ned inventor, I hereby declare that	OIPE
This declaration	is of the following type:	(
	3 31	FEB 1 0 mm 5
[]	original	FEB 0 9 2001 (2)
[]	divisional	
[]	continuation	DADEMARK OF
[X]	continuation-in-part	EMARIA
MING XI,	ASHOK SINHA, MORIS KORI, A CHUNG-LAI	ALFRED W. MAK, JEONG SOO BYUN, LAWRENCE LEI, AND HUA CHUNG
My residence, p first and joint in entitled:	oost office address and citizenship ar nventor of the subject matter which	e as stated below next to my name. I believe I am an original, is claimed and for which a patent is sought on the invention
	TITLE	OF INVENTION .
		TING REFRACTORY METAL LAYERS EMPLOYING NIQUES TO FORM A NUCLEATION LAYER
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The specificatio	n of which:	
ſĵ	is attached hereto	
[X]	was filed on 10/03/2000, under Se	erial No. 09/678,266 and was amended on
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	[X]		applications have t				
A.					n(s) filed within 35 U.S.C. § 119	12 mos. ((6 mos. for design) prior to this
	Countr	y/PCT	<u>Application</u>	on No	<u>Date Filed</u>]	Priority Claimed Yes [] No Yes [] No
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	Country Applica Filing d	tion No:	i i i i i i i i i i i i i i i i i i i				
			PR	IORITY C	LAIM (35 U.S.C.	§120)	
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	[] [X]		applications have l				
						Status	
	Serial N	<u>lo</u> .	Filing Date		Patented Pending	A	Abandoned

Pending

09/605,593

6/28/2000





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Full name of second inv	ventor: Ashok Sinha	
Inventor's signature:		Date:
Residence:	Palo Alto, California	
Post Office Address:	4176 Hubbart Drive	
	Palo Alto, California 95014	
	U.S.A.	Country of Citizenship: U.S.A.



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As a below nam	ned inventor, I hereby declare that:		OIPE
This declaration	is of the following type:		FEB 0 9 2001
			L rep a som 2
[]	original		E FEB U S ZOO. W
[]	divisional		
[]	continuation		Ex all
[X] continuation-in-part		MADEMA	
MING XI,	ASHOK SINHA, MORIS KORI, AI CHUNG-LAI L	LFRED W. MAK, JE EI, AND HUA CHUN	
			o my name. I believe I am an original, ich a patent is sought on the invention
	TITLE C	F INVENTION	
	O AND APPARATUS FOR DEPOSIT SEQUENTIAL DEPOSITION TECHN		
		ON IDENTIFICATIO)N
The specification	n of which:		
[]	is attached hereto		
	was filed on 10/03/2000, under Ser	ial No. 09/678 266 an	d was amended on
()	(if applicable)	m. 110. <u>057070,200</u> m.	a was amenada on
[]		International Applicat	ion No filed on
. ,			on
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	a reasonable Examiner would conside		formation where there is a substantial ling whether to allow the application to
[]	In compliance with this duty there is with 37 CFR 1.98.	s attached an Informat	cion Disclosure Statement in accordance

I hereby claim foreign priority benefits under Title 35, United States Code, §119, of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America or of any United States Provisional Application(s) listed below, and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

having	a filing da	ite before th	at of the application(s	s) of which priority is cla	imed.			
	[X]		oplications have been cations have been file					
Α.			C/provisional applica ny priority claims un	• •	mos. (6 mos. for design) prior to this			
	<u>Countr</u>	y/PCT	Application No	<u>Date Filed</u>	Priority Claimed Yes No Yes No			
В.		All foreign application(s), if any, filed more than 12 mos. (6 mos for design) prior to this U.S application						
	Country Applica Filing d	tion No:			·			
			PRIORIT	Y CLAIM (35 U.S.C. §1	20)			
interna subject provid that is reason which	tional app t matter of ed by the f material to able Exam	olication(s) Teach of the First paragra of the examination the the the Time of the	designating the Unite claims of this applica ph of Title 35, United nation of this applicati consider it important	ed States of America thation is not disclosed in the States Code, §112, I action (namely, information to in deciding whether to	any United States application(s) or PCT at is/are listed below and, insofar as the nat/those prior application(s) in the manner mowledge the duty to disclose information where there is substantial likelihood that a allow the application to issue as a patent national or PCT international filing date of			
	[] [X]		pplications have been ications have been file					
				St	atus			
	Serial N	<u>10</u> . <u>F</u>	iling Date	Patented Pending	<u>Abandoned</u>			
	09/605,5	93 (5/28/2000	Pending				

#4

Atty. Dkt. No.4714 P1/AMI-00-11

COMBINED DECLARATION AND POWER OF ATTORNEY

		•	
As a below nan	ned inventor, I hereby declare that	OIPE	
This declaration	is of the following type:	/ %∖	
Timo decidianation	is of the following type.	4 2000	
[]	original	E FEB 0 9 2001 1	
[]	divisional		
[]	continuation	MADEMARK	
[X]	continuation-in-part	ADEMA	
MING XI,		ALFRED W. MAK, JEONG SOO BYUN, LAWRENCE LEI, AND HUA CHUNG	
My residence, p first and joint in entitled:	oost office address and citizenship are nventor of the subject matter which	re as stated below next to my name. I believe I am an origin is claimed and for which a patent is sought on the invention	inal, ition
	TITLE	OF INVENTION .	
		ITING REFRACTORY METAL LAYERS EMPLOYING INIQUES TO FORM A NUCLEATION LAYER	
	,	TION IDENTIFICATION	
The specification	n of which:		
[]	is attached hereto		
[X]	was filed on 10/03/2000, under Se	erial No. 09/678,266 and was amended on	
	(if applicable)		
[]	was described and claimed in PC	T International Application No filed	d on
	and as amende	d under PCT Article 19 on	
	ACKNOWLEDGMENT OF REVI	EW OF PAPERS AND DUTY OF CANDOR	
I hereby state the claims, as amend	at I have reviewed and understand and the deal ded by any amendment referred to all	the contents of the above-identified specification, including bove.	; the
I acknowledge to Code of Federal	he duty to disclose all information I Regulations, 1.56,	know to be material to patentability in accordance with Title	; 37,
and which is mail and which is mail and that a likelihood that a issue as a patent	reasonable Examiner would consid	application; namely, information where there is a substantial der it important in deciding whether to allow the application	ntial n to
[]	In compliance with this duty there with 37 CFR 1.98.	is attached an Information Disclosure Statement in accorda	ance

I hereby claim foreign priority benefits under Title 35, United States Code, §119, of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America or of any United States Provisional Application(s) listed below, and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

J	0				
	[X]		lications have been tile		
Α.				ation(s) filed within nder 35 U.S.C. § 119	12 mos. (6 mos. for design) prior to this
	Countr	y/PCT	Application No	<u>Date Filed</u>	Priority Claimed [] Yes [] No [] Yes [] No
В.	All for		tion(s), if any, fil	ed more than 12 me	os. (6 mos for design) prior to this U.S.
	Country Applica Filing d	tion No:	f,		
			PRIORIT	Y CLAIM (35 U.S.C.	§120)
interna subject provide that is reasona which	tional app matter of ed by the f material to able Exam	olication(s) do each of the c first paragraph to the examina niner would c	esignating the Unit laims of this applic n of Title 35, Unite tion of this applicationsider it importan	ted States of America ation is not disclosed in d States Code, §112, I tion (namely, informati at in deciding whether	of any United States application(s) or PCT that is/are listed below and, insofar as the highest thought those prior application(s) in the manner acknowledge the duty to disclose information on where there is substantial likelihood that a to allow the application to issue as a patent) he national or PCT international filing date of
	[} [x]		olications have been ations have been fil		
					Status
	Serial N	lo. <u>Fil</u>	ing Date	Patented Pending	Abandoned
	09/605,5	93 6/2	8/2000	Pending	

I hereby appoint the following attorneys and/or agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

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'';

DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and, further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Sec. 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patents issued thereon.

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